DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Batteries on Racks**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Battery type:	Individual Battery Weight:	
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.1)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Plates of the cells are lead-calcium flat-plate, Planté or of Manchex design	Y	N	U	N/A
3.	Each individual battery weighs less than 450 lbs	Y	N	U	N/A
4.	Close-fitting, crush-resistant spacers fill two-thirds of vertical space between cells	Y	N	U	N/A
5.	Cells restrained by end and side rails	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Batteries on Racks**

Equipment description:

Caveats (Cont.)

6.	Racks have longitudinal cross bracing	Y	N	U	N/A
7.	Wood racks evaluated to industry accepted standards	Y	N	U	N/A
8.	Batteries greater than 10 years old specifically evaluated for aging effects	Y	N	U	N/A
9.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Plates of the cells are lead-calcium flat-plate design (i.e., not Manchex design)	Y	N	U	N/A
4.	Batteries supported on two-step racks or single-tier racks; restrained by double side and end rails which are symmetrically located with respect to the cell center-of-gravity	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Batteries on Racks**

Equipment description:

Anchorage (Cont.)

11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Batteries on Racks**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Motor Control Centers**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight of each Cabinet:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.2)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	600 V rating or less	Y	N	U	N/A
3.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential relays	Y	N	U	N/A
4.	Attached weight (except conduit) less than about 100 lbs per cabinet assembly	Y	N	U	N/A
5.	Externally attached items rigidly anchored	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor Control Centers**

Equipment description:

Caveats (Cont.)

6.	General configuration similar to NEMA standards	Y	N	U	N/A
7.	Cutouts in lower half less than 6 in. wide and 12 in. high	Y	N	U	N/A
8.	All doors secured by latch or fastener	Y	N	U	N/A
9.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Floor-mounted cabinet	Y	N	U	N/A
4.	Average weight per section less than 800 pounds	Y	N	U	N/A
5.	Base anchorage utilizing MCC base channels	Y	N	U	N/A
6.	Adequate strength and stiffness in load transfer path from anchorage to base frame (only for "function after" GERS)	Y	N	U	N/A
7.	Essential relays have GERS > 4.5g (only for "function during" GERS)		Y	N	U N/A
8.	Able to reset starters (only for "function after" GERS)	Y	N	U	N/A
9.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together.	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor Control Centers**

Equipment description:

Anchorage (Cont.)

11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor Control Centers**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Low-Voltage Switchgear**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight of each Cabinet:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.3)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	600 V rating or less	Y	N	U	N/A
3.	Side-to-side restraint of draw-out circuit breakers is provided	Y	N	U	N/A
4.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential relays	Y	N	U	N/A
5.	Attached weight (except conduit) less than about 100 lbs per cabinet assembly	Y	N	U	N/A
6.	Externally attached items rigidly anchored	Y	N	U	N/A
7.	General configuration similar to ANSI C37.20 standards	Y	N	U	N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: **Equipment Class: Low-Voltage Switchgear**

Equipment description:

Caveats (Cont.)

8.	Cutouts in lower half of cabinet side sheathing less than 30% of width of side panel wide and less than 60% of width of side panel excluding bus transfer compartment	Y	N	U	N/A
9.	All doors secured by latch or fastener	Y	N	U	N/A
10.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Floor-mounted enclosure	Y	N	U	N/A
4.	Manufactured by major vendor (ITE/Brown Boveri, Westinghouse, or GE)	Y	N	U	N/A
5.	Average weight per section less than 1,600 lbs	Y	N	U	N/A
6.	For 2.5g level GERS, vertical restraint prevents breaker uplift	Y	N	U	N/A
7.	For 2.5g level GERS, outside corners of end units are reinforced, if needed	Y	N	U	N/A
8.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Low-Voltage Switchgear**

Equipment description:

Anchorage (Cont.)

11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Low-Voltage Switchgear**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Medium-Voltage Switchgear**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight of each cabinet:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.4)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	2.4 kV to 4.16 kV rating	Y	N	U	N/A
3.	Internally mounted potential and/or control power transformers are restrained to prevent damage to or disconnection of contacts	Y	N	U	N/A
4.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential relays	Y	N	U	N/A
5.	Attached weight (except conduit) less than about 100 lbs per cabinet bay	Y	N	U	N/A
6.	Externally attached items rigidly anchored	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Medium-Voltage Switchgear**

Equipment description:

Caveats (Cont.)

7.	General configuration similar to ANSI C37.20 standards	Y	N	U	N/A
8.	Cutouts in lower half of cabinet side sheathing less than 30% of width of side panel wide and less than 60% of width of side panel excluding bus transfer compartment	Y	N	U	N/A
9.	All doors secured by latch or fastener	Y	N	U	N/A
10.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Floor-mounted enclosure	Y	N	U	N/A
4.	The switchgear is not a specially-designed type	Y	N	U	N/A
5.	Circuit breakers are truck-mounted type, not jack-up or vertical lift	Y	N	U	N/A
6.	Average weight per vertical section less than 5,000 lbs	Y	N	U	N/A
7.	For 2.5g level GERS, vertical restraint prevents circuit breaker uplift	Y	N	U	N/A
8.	For 2.5g level GERS, circuit break arc chutes are restrained horizontally	Y	N	U	N/A
9.	For 2.5g level GERS, a Beaver Type Z relay is <u>not</u> used in Westinghouse MV switchgear for the "Y" anti-pump relay	Y	N	U	N/A
10.	Separate evaluation of breaker racking mechanism completed; seismic positioner or sufficient side-to-side restraints used	Y	N	U	N/A
11.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Medium-Voltage Switchgear**

Equipment description:

Anchorage (Cont.)

3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N	U	N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N	U	N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Medium-Voltage Switchgear**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Distribution Panels**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight of each Panel:		
Wall mounted:	Floor mounted:	
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.5)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Contains only circuit breakers and switches	Y	N	U	N/A
3.	All latches and fasteners in door secured	Y	N	U	N/A
4.	Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential relays	Y	N	U	N/A
5.	Wall- or floor-mounted NEMA type-enclosure	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Distribution Panels**

Equipment description:

Caveats (Cont.)

6.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	If Switchboard GERS used, item is freestanding and designated as a switchboard by the manufacturer	Y	N	U	N/A
4.	No Westinghouse Quicklag Type E Breakers	Y	N	U	N/A
5.	Adjacent cabinets which are close enough to impact are bolted together	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Distribution Panels**

Equipment description:

Anchorage (Cont.)

11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Distribution lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Distribution Panels**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Transformers**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	
Type (air cooled, oil cooled):	Voltage:	
Wall mounted:	Floor mounted:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.6)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	4.16 kV rating or less	Y	N	U	N/A
3.	For floor-mounted dry- and oil-type unit, transformer coils are positively restrained within cabinet	Y	N	U	N/A
4.	For 750 kVA or larger units, coils are top braced or adequately shown by evaluation	Y	N	U	N/A
5.	For 750 kVA or larger units, 2-inch clearance is provided between energized component and cabinet	Y	N	U	N/A
6.	For 750 kVA or larger units, the slack in the connection between the high-voltage leads and the first anchor accommodates 3-inch relative displacement	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Transformers**

Equipment description:

Caveats (Cont.)

7.	For wall-mounted units, transformer coils anchored to enclosure near enclosure support surface	Y	N	U	N/A
8.	For floor-mounted units, anchorage does not rely on weak-way bending of cabinet structures under lateral forces	Y	N	U	N/A
9.	Adjacent cabinets which are close enough to impact are bolted together if they contain essential relays	Y	N	U	N/A
10.	All doors secured by latch or fastener	Y	N	U	N/A
11.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Dry-type unit (not oil-filled)	Y	N	U	N/A
4.	Wall- or floor-mounted NEMA-type enclosure	Y	N	U	N/A
5.	120 to 480 VAC rating	Y	N	U	N/A
6.	7.5 to 225 kVA rating	Y	N	U	N/A
7.	180 to 2,000 pounds weight	Y	N	U	N/A
8.	Internal supports provide positive attachment of transformer components	Y	N	U	N/A
9.	There is a sufficient clearance of 3/8 inches between bare conductors and enclosure	Y	N	U	N/A
10.	Adjacent cabinets which are close enough to impact are bolted together	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: **Equipment Class: Transformers**

Equipment description:

Anchorage (Cont.)

11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N	U	N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Transformers**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Battery Chargers and Inverters**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Voltage Input:	Output	
Current:	Weight (approximate):	
Actuator type:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.7)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Solid state type	Y	N	U	N/A
3.	For floor-mounted, transformer positively anchored and mounted near base, or load path is evaluated	Y	N	U	N/A
4.	Base-assembly of floor-mounted unit properly braced or stiffened for lateral forces	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Battery Chargers and Inverters**

Equipment description:

Caveats (Cont.)

5.	For wall-mounted units, transformer supports and bracing provide adequate load path to the rear cabinet wall	Y	N	U	N/A
6.	All latches and fasteners in doors secured	Y	N	U	N/A
7.	Adjacent cabinets which are close enough to impact are bolted together if they contain essential relays	Y	N	U	N/A
8.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Silicon-controlled Rectifier (SCR) power controls; wall- or floor-mounted NEMA-type enclosure	Y	N	U	N/A
4.	Within range of battery charger ratings:				
	24-250 VDC	Y	N	U	N/A
	120-480 VAC	Y	N	U	N/A
	25-600 amps	Y	N	U	N/A
	150-2,850 pounds (floor mounted)	Y	N	U	N/A
	150-600 pounds (wall mounted)	Y	N	U	N/A
5.	Within range of inverter ratings:				
	120 VDC only	Y	N	U	N/A
	120-480 VAC	Y	N	U	N/A
	0.5-15 kVA	Y	N	U	N/A
	300-2,000 pounds	Y	N	U	N/A
6.	Heavy components are located in lower half of cabinet and are supported from base or rear panel with no panel cutouts adjacent to attachment	Y	N	U	N/A
7.	Adjacent cabinets which are close enough to impact are bolted together	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Battery Chargers and Inverters**

Equipment description:

Anchorage (Cont.)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N	U	N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Battery Chargers and Inverters**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Instrumentation and Control Panels**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Weight of each Panel:		
Manufacturer, model, etc.:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.8)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	No computers or programmable controllers	Y	N	U	N/A
3.	Strip chart recorders evaluated	Y	N	U	N/A
4.	Steel frame and sheet metal structurally adequate	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Instrumentation and Control Panels**

Equipment description:

Caveats (Cont.)

5.	Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays	Y	N	U	N/A
6.	Drawers and equipment on slides restrained from falling out	Y	N	U	N/A
7.	All doors secured by latch or fastener	Y	N	U	N/A
8.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Instrumentation and Control Panels**

Equipment description:

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N	U	N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
Is equipment free of interaction effects?		Y	N	U	

Comments

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Instrumentation and Control Panels**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Instruments on Racks**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.9)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	No computers or programmable controllers	Y	N	U	N/A
3.	Steel frame and sheet metal structurally adequate	Y	N	U	N/A
4.	Adjacent racks which are close enough to impact, or sections of multi-bay racks, are bolted together if they contain essential relays	Y	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Instruments on Racks**

Equipment description:

Caveats (Cont.)

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Component is a pressure, temperature, level or flow transmitter	Y	N	U	N/A
4.	Component is one of the specific makes and models tested	Y	N	U	N/A
5.	Necessary function of component not sensitive to seismically induced system perturbations (e.g., sloshing)	Y	N	U	N/A
6.	No vacuum tubes	Y	N	U	N/A
7.	All external mounting bolts in place	Y	N	U	N/A
8.	Demand based on amplified portion of 3% damped floor response spectrum if estimated natural frequency of rack less than 33 Hertz	Y	N	U	N/A
9.	Rack capable of structurally transferring GERS level seismic loads to anchorage	Y	N	U	N/A
10.	Adjacent racks which are close enough to impact, or sections of multi-bay racks, are bolted together	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Instruments on Racks**

Equipment description:

Anchorage (Cont.)

11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Instruments on Racks**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Temperature Sensors**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Approximate Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.1.10)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	No possibility of detrimental differential displacement between mounting of connection head and mounting of temperature sensor	Y	N	U	N/A
3.	Associated electronics are all solid state (no vacuum tubes)	Y	N	U	N/A
4.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Temperature Sensors**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Temperature Sensors**

Equipment description:

Comments

Screening Walkdown(s):

Date Time Team Members

Recommend Resolution

❑ Maintenance action: _____

❑ Further evaluation: _____

❑ Retrofit design: _____

❑ Other: _____

❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Fluid-Operated/ Air-Operated Valves**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Smallest pipe diameter attached to valve:		
Pipe centerline to top of motor actuator length:		
Valve material:	Yoke material:	
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.1)

Reference Spectrum Fluid-Operated Valves (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	No cast-iron body	Y	N	U	N/A
3.	No cast-iron yoke (for spring-operated pressure relief or piston-operated valves)	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Fluid-Operated/ Air-Operated Valves**

Equipment description:

Caveats (Cont.)

4.	Mounted on 1-inch diameter pipe or larger	Y	N	U	N/A
5.	Centerline of pipe to top of operator within restrictions or yoke can take static 3g load (for air-operated diaphragm, lightweight piston-operated, and spring-operated pressure relief valves)	Y	N	U	N/A
6.	Centerline of pipe to top of operator within restrictions or yoke can take static 3g load (for piston-operated valve of substantial weight)	Y	N	U	N/A
7.	Actuator and yoke not braced independently from pipe	Y	N	U	N/A
8.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS Air-Operated Valves (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Air-operated gate or globe valve with spring-opposed diaphragm-type pneumatic actuator	Y	N	U	N/A
4.	Use amplified response spectrum of piping system at piping/ valve interface	Y	N	U	N/A
5.	Valve and operator will not impact surrounding structures and components	Y	N	U	N/A
6.	Mounted on 1- to 3-inch nominal pipe line	Y	N	U	N/A
7.	Carbon steel (not cast iron) yoke or bonnet	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Fluid-Operated/ Air-Operated Valves**

Equipment description:

Anchorage (Cont.)

10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Fluid-Operated/ Air-Operated Valves**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Motor-Operated Valves**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Smallest pipe diameter attached to valve:		
Pipe centerline to top of motor actuator length:		
Valve material:	Yoke material:	
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.2)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	No cast-iron body	Y	N	U	N/A
3.	No cast-iron yoke	Y	N	U	N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor-Operated Valves**

Equipment description:

Caveats (Cont.)

4.	Mounted on 1-inch diameter pipe or larger	Y	N	U	N/A
5.	Centerline of pipe to operator within restrictions or yoke can take static 3g load	Y	N	U	N/A
6.	Actuator and yoke not braced independently from pipe	Y	N	U	N/A
7.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) (Note that GERS for this class apply to only motor operator and its connection to valve; valve itself and valve/pipe interface are not covered.)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Use amplified spectrum of piping system and valve at valve/operator interface	Y	N	U	N/A
4.	Motor axis is horizontal	Y	N	U	N/A
5.	Valve and operator will not impact surrounding structures and components	Y	N	U	N/A
6.	Motor controls remotely located	Y	N	U	N/A
7.	If valve has side mounted actuator attached to secondary reducer, seismic brackets are used				
8.	Manufactured by Limitorque or Rotork				
9.	Any loose or missing valve-to-operator bolts are tightened or replaced (tightness check not required)				
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor-Operated Valves**

Equipment description:

Anchorage (Cont.)

5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor-Operated Valves**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Solenoid-Operated Valves**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Smallest pipe diameter attached to valve:		
Pipe centerline to top of motor actuator length:		
Valve material:	Yoke material:	
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.2)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	No cast-iron body	Y	N	U	N/A
3.	No cast-iron yoke	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Solenoid-Operated Valves**

Equipment description:

Caveats (Cont.)

4.	Centerline of pipe to operator within restrictions or yoke can take static 3g load	Y	N	U	N/A
5.	Actuator and yoke not braced independently from pipe	Y	N	U	N/A
6.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) (Note that GERS for this class apply to only motor operator and its connection to valve; valve itself and valve/pipe interface are not covered.)

1.	Equipment is included in generic seismic testing equipment class	Y	N	U	N/A
2.	Meets all Reference Spectrum caveats	Y	N	U	N/A
3.	Use amplified spectrum for piping system at piping/valve interface	Y	N	U	N/A
4.	Valve and operator will not impact surrounding structures and components	Y	N	U	N/A
5.	Nominal pipe size is 1 inch or less	Y	N	U	N/A
6.	Valve body is forged brass or steel	Y	N	U	N/A
7.	Housing oriented in accordance with manufacturer's recommendations	Y	N	U	N/A
8.	Height of valve (pipe centerline to top of housing) does not exceed 12 in.	Y	N	U	N/A
9.	If SOV is a pilot on a larger valve, use amplified response spectrum at attachment point of SOV to larger valve	Y	N	U	N/A
10.	Use 3.5g ZPA GERS for ASCO Type 206-381	Y	N	U	N/A
	Is the intent of all the caveats met for GERS?	Y	N	U	N/A

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Solenoid-Operated Valves**

Equipment description:

Anchorage (Cont.)

7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	
	Does anchorage capacity exceed demand?	Y	N	U	

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Solenoid-Operated Valves**

Equipment description:

***Comments** (Cont.)*

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Horizontal Pumps**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Drawing No.:	Performance Category:	
Weight:		
Horsepower/Motor rating: RPM	Head	Flow rate

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.3)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Driver and pump connected by rigid base or skid	Y	N	U	N/A
3.	Shaft has thrust restraint in both axial directions	Y	N	U	N/A
4.	No risk of excessive nozzle loads such as gross pipe motion or differential displacement	Y	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A
	Is the intent of all the caveats met for Reference Spectrum?	Y	N	U	N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Horizontal Pumps**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Horizontal Pumps**

Equipment description:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Vertical Pumps**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Drawing No.:	Performance Category:	
Weight:		
Horsepower/Motor rating: RPM	Head	Flow rate

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.4)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Casing and impeller shaft not cantilevered more than 20 feet, with radial bearing at bottom to support shaft	Y	N	U	N/A
3.	No risk of excessive nozzle loads such as gross pipe motion or differential displacement	Y	N	U	N/A
4.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Vertical Pumps**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Vertical Pumps**

Equipment description:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Chillers**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.5)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Evaporator and condenser tanks reasonably braced between themselves for lateral forces without relying on weak-way bending of steel plates or structural steel shapes	Y	N	U	N/A
3.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Chillers**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Chillers**

Equipment description:

Comments

Screening Walkdown(s):

Date Time Team Members

Recommend Resolution

❑ Maintenance action: _____

❑ Further evaluation: _____

❑ Retrofit design: _____

❑ Other: _____

❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Air Compressors**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.6)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Air Compressors**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N	U	N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N	U	N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Air Compressors**

Equipment description:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Motor-Generators**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.7)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Main driver and driven equipment connected by a rigid support or skid	Y	N	U	N/A
3.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor-Generators**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Motor-Generators**

Equipment description:

Comments

Screening Walkdown(s):

Date Time Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Engine-Generators**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.8)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Driver and driven equipment connected by a rigid support or common skid	Y	N	U	N/A
3.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Engine-Generators**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Engine-Generators**

Equipment description:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Air Handlers**	
Equipment description:		
System:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.9)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Anchorage of heavy internal components is adequate; internal vibration isolators have seismic stops to limit uplift and lateral movement	Y	N	U	N/A
3.	All doors secured by latch or fastener	Y	N	U	N/A
4.	No possibility of excessive duct distortion causing binding or misalignment of any internal fan	Y	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Air Handlers**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Air Handlers**

Equipment description:

Comments

Screening Walkdown(s):

Date Time Team Members

Recommend Resolution

❑ Maintenance action: _____

❑ Further evaluation: _____

❑ Retrofit design: _____

❑ Other: _____

❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Fans**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Caveats (Section 8.2.10)

Reference Spectrum (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	Y	N	U	N/A
2.	Drive motor and fan mounted on common base	Y	N	U	N/A
3.	For axial fan with long shaft between fan and motor, shaft supported at fan as well as motor	Y	N	U	N/A
4.	No possibility of excessive duct distortion causing binding or misalignment of fan	Y	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A

Is the intent of all the caveats met for Reference Spectrum? Y N U N/A

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: | **Equipment Class: Fans**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N	U	N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A

Is equipment free of interaction effects? Y N U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Fans**

Equipment description:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Horizontal Tanks and Heat Exchangers**	
Equipment description:		
Equipment Location: Bldg.	Floor El.	Room, Row/Col.
Manufacturer, model, etc.:		
Approximate weight:		
Drawing No.:	Performance Category:	

Functionality Requirement

- ❑ Contact Lead Relay Reviewer to determine if item contains Essential Relays
- ❑ For components whose function or structural integrity is required, complete all sections of this form.
- ❑ For all other components, only anchorage evaluation is required.

Caveats (Section 9.1.2)

(Identify with an asterisk (*) those steps which are met by intent without meeting the specific wording of the step and explain the reason for this conclusion in the COMMENTS section below)

Step 1	Parameters and values within range of applicable parameters	Y	N	U	N/A
Step 2	Anchor bolt tension and shear load allowables determined	Y	N	U	N/A
Step 3	Base plate bending strength reduction factor (RB) determined	Y	N	U	N/A
Step 4	Base plate weld strength reduction factor (RW) determined	Y	N	U	N/A
Step 5	Anchorage tension allowable determined using strength reduction factors	Y	N	U	N/A
Step 6	Ratios and values calculated	Y	N	U	N/A
Step 7	Acceleration capacity of tank anchorage determined	Y	N	U	N/A
Step 8	Flexibility of tank in transverse and vertical directions determined	Y	N	U	N/A
Step 9	Flexibility of tank in longitudinal direction determined	Y	N	U	N/A
Step 10	Capacity acceleration exceeds seismic demand acceleration	Y	N	U	N/A
Step 11	Saddle stresses checked	Y	N	U	N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Horizontal Tanks and Heat Exchangers**

Equipment description:

Anchorage (Chapter 6)

1. Type of anchorage:
   - ❑ expansion anchor
   - ❑ cast-in-place bolt or headed stud anchor
   - ❑ cast-in-place J-bolt
   - ❑ grouted-in-place bolt
   - ❑ welds to embedded steel on exposed steel
   - ❑ lead cinch anchors
   - ❑ Other _____
   - ❑ N/A (no further anchorage considerations)

2.	Appropriate characteristics for anchorage type checked (size, location, equipment characteristics)	Y	N	U	
3.	Gap at threaded anchor less than 1/4 inch	Y	N	U	N/A
4.	Base stiffness and no significant prying action requirements met	Y	N	U	
5.	Equipment base strength and structural load path adequate	Y	N	U	
6.	Embedment steel and pads requirements met	Y	N	U	N/A
7.	Embedment length requirements met	Y	N	U	
8.	Anchor spacing requirements met	Y	N	U	
9.	Edge distance requirements met	Y	N	U	
10.	Concrete strength requirements met	Y	N	U	
11.	Concrete crack requirements met	Y	N	U	
12.	Equipment with essential relays requirements met	Y	N	U	N/A
13.	Installation adequacy requirements met	Y	N	U	N/A
14.	No other concerns	Y	N	U	

Does anchorage capacity exceed demand? Y N U

Reference: _____

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Horizontal Tanks and Heat Exchangers**

Equipment description:

Interaction Effects (Cont.)

6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
Is equipment free of interaction effects?		Y	N	U	

Comments

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Horizontal Tanks and Heat Exchangers**

Equipment description:

Comments (Cont.)

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: Cable and Conduit Raceway Systems**	
Cable tray/Conduit identification:		
Systems:		
Building:	Floor El. (S):	Location:
Performance Category:		

Tray System or Conduit Boundary

Cable tray/Conduit description:

Description or sketch (attach sheets as necessary):

Functionality Requirement

- ❑ Maintain electrical cable function
- ❑ Maintain position

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Cable and Conduit Raceway Systems**

Cable tray/Conduit identification:

Systems:

Seismic Capacity vs. Demand (Chapter 5)

1. Seismic Capacity based on:
   - ❑ Reference Spectrum
   - ❑ GERS
   - ❑ Existing documentation
2. Elevation where equipment receives seismic input _____
   Seismic Demand Spectrum (SDS) based on:
   - ❑ In-structure response spectrum (IRS) per DOE-STD-1020
   - ❑ Other in-structure response spectrum (determine appropriate experience data scale factor)
   - ❑ Design basis earthquake (DBE) per DOE-STD-1020
   - ❑ Other _____

   Scale Factor (SF) _____ Experience Data Factor (F_{ED}) _____

Does capacity exceed demand? Y N U

Reference:_____

Inclusion Rules Review (Section 9.2.1)

1. Cable tray spans	Y	N	U	N/A
2. Conduit spans	Y	N	U	N/A
3. Tie downs	Y	N	U	N/A
4. Channel nuts	Y	N	U	N/A
5. Rigid boots	Y	N	U	N/A
6. Beam clamps	Y	N	U	N/A
7. Cast-iron inserts	Y	N	U	N/A

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Cable and Conduit Raceway Systems**

Cable tray/Conduit identification:

Systems:

General Walkdown Review (Section 9.2.1)

1.	Anchor bolts	Y	N	U	N/A
2.	Concrete condition	Y	N	U	N/A
3.	Corrosion	Y	N	U	N/A
4.	Sagging raceways	Y	N	U	N/A
5.	Broken or missing components	Y	N	U	N/A
6.	Restraint of cables	Y	N	U	N/A
7.	Aging of plastic ties	Y	N	U	N/A
8.	System hardspots	Y	N	U	N/A
	Welded connections	Y	N	U	N/A
	Components and sharp edges	Y	N	U	N/A
	Bare cables	Y	N	U	N/A
	Cable fill/ties	Y	N	U	N/A
	Short rods	Y	N	U	N/A

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
Is equipment free of interaction effects?		Y	N	U	

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)	
Equipment ID No.:	**Equipment Class: Cable and Conduit Raceway Systems**
Cable tray/Conduit identification:	
Systems:	
Analytical Review Support Selection	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)	
Equipment ID No.:	**Equipment Class: Cable and Conduit Raceway Systems**
Cable tray/Conduit identification:	
Systems:	

Analytical Review Data Sheet

Room No.: _____ Selection No.: _____

Location: _____

Description and Sketch:

Additional Notes:

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: Cable and Conduit Raceway Systems**

Cable tray/Conduit identification:

Systems:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Piping System ID No.:	**Equipment Class: Piping**

Performance Category:

System Description and Fluid Boundaries:

Piping System Function and Contents

☐ Operability ☐ Pressure Boudary ☐ Position Retention

Piping Layout and Structural Boundaries
Piping System Location and Reference Drawings

Piping Materials and Sizes

Weights

Concurrent Pressure and Temperature

Input Response Spectra and SAM-Reference

☐ Final ☐ Preliminary

Applicability

☐ Ductile material ☐ D/t<50 ☐ -20°F ≤ T ≤ 250°F ☐ Reference Spectra

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)		
Piping System ID No.:	**Equipment Class: Piping**	
Screening Criterion (Section 10.1.1)	**Screening Criterion Met**	**Notes**
Construction: Piping, components and supports shall be undamaged and of good construction.		
Internal Degradation: Piping and components shall be free of signigicant internal degradation.		
External Corrosion: Piping, components and supports shall be free of significant external corrosion.		
Vertical Span: Piping shall be well supported vertically.		
Lateral Span: Piping shall be sufficiently restrained in the lateral direction.		
Anchor Motion: Piping shall have sufficient flexibility to accommodate the seismic motions of structures, equipment and headers to which it is attached.		
Mechanical Joints: Piping shall not contain mechanical joints which rely solely on friction.		
Flanged Joints: Flanged joints shall withstand the expected seismic moments without leakage.		
Equipment Nozzle Loads: Equipment shall not be subjected to large seismic loads from the piping systems.		
Eccentric Weights: Eccentric Weights in piping systems shall be evaluated.		
Flexible Joints: Flexible joints shall be properly restrained to keep relative end movements within vendor limits.		
Evaluation of Pipe Supports: Pipe supports shall be capable of withstanding seismic loads without failure.		
Interaction with Other Components: The piping being reviewed shall not be a source of interactions by displacement or swing impact on adjacent components.		
No other concerns		

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Piping System ID No.:	**Equipment Class: Piping**

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)

Equipment ID No.:	**Equipment Class: HVAC Ducts**	
HVAC line identification:		
System:		
Building:	Floor El. (s):	Location:
Operating Pressure:	PSIG	Inches of water
Performance Category:		

Duct System Boundary

Description or sketch (attach sheets as necessary):

Functionality Requirement

1. During seismic event	Y	N	U	
2. After seismic event	Y	N	U	

Structural Integrity Review (Section 10.4.1)

1.	Duct free of damage, defects, and degradation	Y	N	U	N/A
2.	Industry standard duct material and stiffeners are utilized	Y	N	U	N/A
3.	Industry standard duct joints are utilized	Y	N	U	N/A
4.	Support spans satisfy the criteria	Y	N	U	N/A
5.	Ducts are properly tied-down to the supports	Y	N	U	N/A
6.	Heavy in-line equipment is adequately restrained	Y	N	U	N/A
7.	Appurtenances are positively attached to duct	Y	N	U	N/A
8.	No stiff branch with flexible header	Y	N	U	N/A
9.	No other concerns	Y	N	U	N/A
	Are the above caveats met?	Y	N	U	

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.: **Equipment Class: HVAC Ducts**

HVAC line identification:

System:

Pressure Boundary Integrity Review (Section 10.4.1)

	Is any pressure boundary integrity required?	Y	N	U	
	If the answer to the above question is NO, SKIP THIS SECTION				
1.	Duct joints are rugged	Y	N	U	N/A
2.	Stiffener spacings are within the guidelines	Y	N	U	N/A
3.	Bolted flanged joints satisfy SMACNA (Tables G and H) requirements	Y	N	U	N/A
4.	No point supported round duct	Y	N	U	N/A
5.	Flexible bellows can accomodate motions	Y	N	U	N/A
6.	No additional concerns	Y	N	U	N/A
	Are the above caveats met?	Y	N	U	

Support Review (Section 10.4.1)

1.	Beam Clamps are oriented to preclude slipping off the support, channel	Y	N	U	N/A
	nuts have teeth or ridges, and no cast-iron inserts	Y	N	U	N/A
2.	Support memeber capacity exceeds demand	Y	N	U	N/A
3.	Does the anchorage appear adequate?	Y	N	U	N/A
4.	No broken or obviously defective hardware				
5.	No additional concerns	Y	N	U	N/A
	Are the above caveats met?	Y	N	U	

Interaction Effects (Chapter 7)

1.	Soft targets free from impact by nearby equipment or structures	Y	N	U	N/A
2.	If equipment contains sensitive essential relays, equipment free from all impact by nearby equipment or structures	Y	N	U	N/A
3.	Attached lines have adequate flexibility	Y	N	U	N/A
4.	No collapse of overhead equipment, distribution systems, or masonry walls	Y	N		N/A
5.	Equipment is free from credible and significant seismic-induced flood and spray concerns	Y	N		N/A
6.	No credible seismic-induced fire concerns	Y	N		N/A
7.	No other “two over one” concerns as defined in DOE-STD-1021	Y	N		N/A
8.	No other concerns	Y	N	U	N/A
	Is equipment free of interaction effects?	Y	N	U	

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: HVAC Ducts**

HVAC line identification:

System:

Bounding Candidate Evaluation

Duct is not a candidate for bounding calculations Y N U N/A

Discussion:

Analytical Review

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

Equipment ID No.:	**Equipment Class: HVAC Ducts**

HVAC line identification:

System:

Comments

Screening Walkdown(s):

Date Time Team Members

Recommend Resolution

❑ Maintenance action: _____

❑ Further evaluation: _____

❑ Retrofit design: _____

❑ Other: _____

❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS)		
ID No.:	**Equipment Class:**	
Building:		
Performance Category:	Floor El. (s):	Location:

Description or Sketch

Functionality Requirement

1. During seismic event	Y	N	U
2. After seismic event	Y	N	U

DOE Seismic Evaluation Procedure

SCREENING EVALUATION WORK SHEET (SEWS) (Cont.)

ID No.:	**Equipment Class:**	
Building:	Floor El. (s):	Location:

Comments

Screening Walkdown(s):

Date	Time	Team Members

Recommend Resolution

- ❑ Maintenance action: _____
- ❑ Further evaluation: _____
- ❑ Retrofit design: _____
- ❑ Other: _____
- ❑ No further action required. Equipment is seismically adequate.

All aspects of the equipment's seismic adequacy have been addressed.

Evaluation by: _____ Date: _____

(All team members) _____ _____

_____ _____

_____ _____

DOE Seismic Evaluation Procedure

OUTLIER SEISMIC EVALUATION SHEET (OSES)

1. OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION

SEWS Form _____

Equipment ID Number _____ Equipment Class _____

Equipment Location: Building _____ Floor Elevation _____

Room or Row/Column _____ Base Elevation _____

Equipment Description _____

_____

Performance Category _____

2. OUTLIER ISSUE DEFINITION

a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Mechanical and Electrical Equipment		Tanks and Heat Exchangers	
Seismic Capacity vs. Demand	_____	Caveats	_____
Reference Spectrum Caveats	_____	Anchorage	_____
GERS Caveats	_____	Interaction Effects	_____
Anchorage	_____	Other	_____
Interaction Effects	_____		
Other	_____		

Essential Relays		Cable and Conduit Raceway Systems	
Seismic Capacity vs. Demand	_____	Seismic Capacity vs. Demand	_____
Interaction Effects	_____	Inclusion Rules Review	_____
Mounting, Type, Location	_____	General Walkdown Review	_____
Other	_____	Interaction Effects	_____
		Analytical Review	_____
		Other	_____

OUTLIER SEISMIC EVALUATION SHEET (OSES) (Cont.)

Piping		HVAC Ducts	
Screening Criterion	_____	Structural Integrity Review	_____
Other	_____	Pressure Boundary Integrity Review	_____
		Support Review	_____
		Interaction Effects	_____
		Analytical Review	_____
		Other	_____

b. Describe all the reasons for the outlier (i.e., if all the listed outer issues were resolved, then the signatories would consider this item of equipment to be evaluated for seismic adequacy):

_____

_____

_____

_____

_____

_____

3. PROPOSED METHOD OF OUTLIER RESOLUTION

a. Define proposed method(s) of resolving outlier:

_____

_____

_____

_____

_____

_____

OUTLIER SEISMIC EVALUATION SHEET (OSES) (Cont.)

b. Provide information needed to implement proposed method(s) for resolving outlier:

_____

_____

_____

_____

_____

_____

c. Provide information on potential hardware upgrades:

_____

_____

_____

_____

_____

_____

DOE Seismic Evaluation Procedure

SEDS (1 of 2) Sheet 1 of _____

SCREENING EVALUATION DATA SHEET (SEDS)							
Equip. Class (1)	Equip. ID No. (2)	System/Equipment Description (3)	Bldg. (4)	Floor Elev. (5)	Room or Row/Col (6)	Base Elev. (7)	Capacity Spectrum (8)

SIGNATURES:

All the information contained on this Screening Evaluation Data Sheet (SEDS) is, to the best of our knowledge and belief, correct and accurate. "All information" includes each entry and conclusion (whether evaluated to be seismically adequate or not).

Approved: All Seismic Capability Engineers on the Seismic Review Team should sign.

_____ _____ _____
Print or Type Name Signature Date

_____ _____ _____
Print or Type Name Signature Date

_____ _____ _____
Print or Type Name Signature Date

DOE Seismic Evaluation Procedure

SCREENING EVALUATION DATA SHEET (SEDS) (Cont.)							
F_{ED} (9)	Demand Spectrum (10)	Cap > Demand? (11)	Caveats OK? (12)	Anchorage OK? (13)	Interact. OK? (14)	Equipment OK? (15)	Notes (16)

ADDITIONAL SIGNATURES:

The information provided to the Seismic Capability Engineers regarding systems and operations of the equipment contained on this SEDS is, to the best of our knowledge and belief, correct and accurate.

Approved: Signature(s) of Systems or Operations Engineers are required if the Seismic Capability Engineers deem it necessary.

_____	_____	_____
Print or Type Name	Signature	Date
_____	_____	_____
Print or Type Name	Signature	Date
_____	_____	_____
Print or Type Name	Signature	Date